

Name _____

Modeling Predator/Prey Interactions

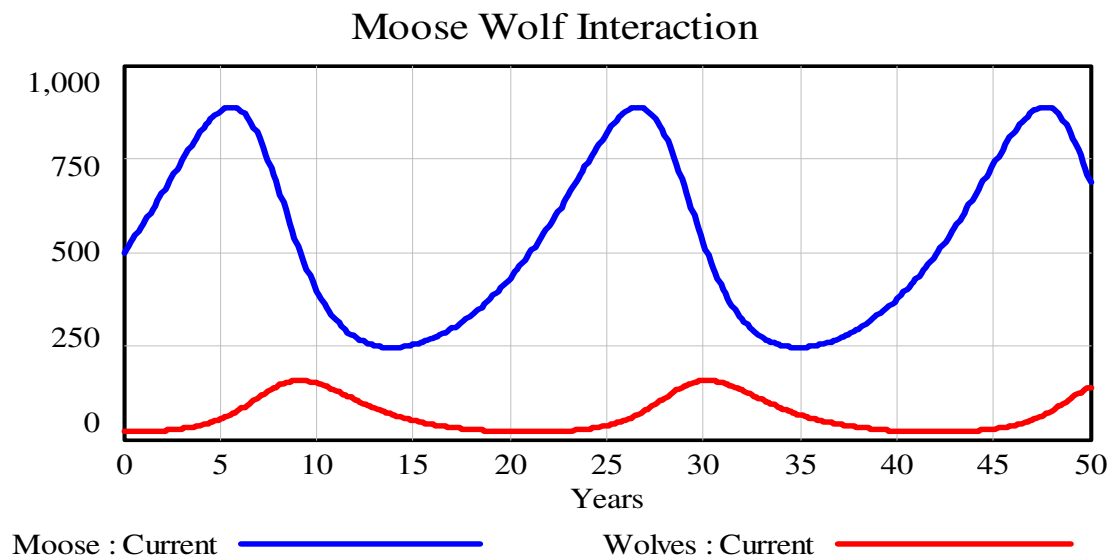
25 pts

Introduction:

The moose is an herbivore while the wolf is a carnivore and predator of the moose. These predators and prey help to keep each other's populations balanced in an ecosystem. Using the Vensim program, you will manipulate different wolf and moose parameters and note how their population sizes change.

Directions:

- 1.) Locate the Vensim icon on the desktop of your computer and click on the "predprey" application.
 - Once in the Vensim program a dialogue box may appear. If so, click "YES".
 - When a second dialogue box appears, click "OK".
- 2.) Near the top of the screen you will find a **GREEN ARROW** labeled **SIMULATE**. Click on this simulate button.
 - When another dialogue box appears, click "OK" and then save the file as "Predator Prey."
 - (A dialog box may appear telling you to save it someplace else. Click "Yes" and then "Save.")
- 3.) Two bars will appear. The Blue bar is labeled MOOSE, and the red bar is labeled WOLF.
- 4.) A graph of wolf and moose populations will be located to the right of the bars, where population is graphed on the y-axis and time (in years) is graphed on the x-axis. The **MOOSE POPULATION** is graphed in **BLUE** and the **WOLF POPULATION** is graphed in **RED**.
- 5.) Notice, the trends in population size are similar to those you graphed in the hare/lynx activity. Review these patterns by answering the questions under the graph.



1. As the moose population increases, the wolf population _____.
2. After the moose and wolf populations increase, the moose population _____.
3. As the moose population decreases, the wolf population _____.
4. After the moose and wolf populations decrease, the moose population _____.

Directions for Part 2:

- 1.) Click on the **GREEN ARROW** labeled “**SYNTHESIM**” located at the top of the screen.
- 2.) When a dialogue box appears, click on “**YES**”.
- 3.) Four sliding bars should appear. These will allow you to change the birth and death rate for the moose and wolf populations.
- 4.) Change each of the parameters individually according to the questions below, **AFTER** you first record your prediction.
- 5.) Pay attention to the y-axis population scale, as its numbers may change.
- 6.) Remember to reset the bars by clicking on the “**RESET ALL**” button located at the top of the screen **BEFORE EACH QUESTION!**
- 7.) When you are completely finished, you can close the program. You do **NOT** need to save changes.

Questions:

- 1.) If the birth rate of the moose population increased, predict what you think would happen to the:
 - Moose population
 - Wolf population

Now, change the sliding bar labeled “**moose birth fraction**” to **0.5**.

- What happened to the moose population?
- What happened to the wolf population?

- 2.) If the death rate of the moose population increased, predict what you think would happen to the:
 - Moose population
 - Wolf population

Now, change the sliding bar labeled “**moose death likelihood**” to **0.05**.

- What happened to the moose population?
- What happened to the wolf population?

- 3.) If the birth rate of the wolf population increased, predict what you think would happen to the:
 - Moose population
 - Wolf population

Now, change the sliding bar labeled “**wolf birth likelihood**” to **0.05**.

- What happened to the moose population?
- What happened to the wolf population?

4.) If the death rate of the **wolf** population increased, predict what you think would happen to the:

- Moose population
- Wolf population

Now, change the sliding bar labeled “**wolf death fraction**” to 0.75.

- What happened to the moose population?
- What happened to the wolf population?

5.) If the birth rate of the **wolf** population decreased, predict what you think would happen to the:

- Moose population
- Wolf population

Now, change the sliding bar labeled “**wolf birth likelihood**” to 0.

- What happened to the moose population?
- What happened to the wolf population?

6.) If the death rate of the **wolf** population decreased, predict what you think would happen to the:

- Moose population
- Wolf population

Now, change the sliding bar labeled “**wolf death fraction**” to 0.25.

- What happened to the moose population?
- What happened to the wolf population?

7.) Now you can manipulate the bars to create your own graph. (Make sure you do NOT see an error appear in yellow anywhere.) Record the values to which you set each parameter AND explain what happened to the moose and wolf populations as a result.

- Moose birth fraction =
- Moose death likelihood =
- Wolf birth likelihood =
- Wolf death fraction =
- What happened to the moose population?
- What happened to the wolf population?

8.) Explain why it is important in an ecosystem that **BOTH** predators and prey exist.